STEM TRANSFER PARTNERSHIP SERIES

Structuring STEM Transfer Partnership Success

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DATA NOTE 1 | AUGUST 2022

Both policymakers and educators have identified the pressing need for clear and consistent pathways from two-year to four-year postsecondary institutions in STEM fields. Though numerous interventions for transfer pathways have been designed and implemented, there remains a need for effective and sustainable models of transfer partnership that address the specific needs of STEM transfer students. This report describes the key components of a successful program to initiate a community of practice for STEM transfer that supports a cultural shift from siloed colleges and universities to an interconnected system that centers student success.

INTRODUCTION

Broadening participation in STEM fields through more inclusive educational pathways has been a priority of policymakers and educational organizations alike for decades, motivated by a drive for innovation, economic growth, and global preeminence. However the diversification of STEM is not just an issue of workforce development and technological innovation but also an equity issue. Careers in STEM fields are among those with the highest median wages and lowest rates of unemployment (NSB, 2020; NSB, 2018) and thus educational pathways to STEM careers can offer low income students an opportunity for social and economic mobility. Unfortunately, that path remains one not equally accessible to all. Low income students are less likely to enter college with the curricular requirements for STEM degrees and less likely to graduate with one when compared to economically privileged students (Zhang, 2019; Pearson et al., 2022; NSC, 2020). Added to this, students from low income backgrounds are far more likely to enroll in a two-year institution, with as little as 25% of bottom income quintile students enrolling in four-year institutions, compared to 90% enrollment in four-year institutions among students from the top income quintile (Mulhern et al., 2015; Maltese & Tai, 2011). These factors combined highlight the barriers to equity embedded in postsecondary STEM educational pathways. Low income students are excluded from an economically viable career, starkly inequitable economic hierarchies are sustained, and local, state, and national communities lose a vibrant, diverse STEM workforce as a result of structural barriers. Policymakers and educators are well aware of this problem and have funded and implemented a variety of interventions designed to increase STEM participation and persistence among underrepresented groups. However, at the postsecondary level, these programs have not significantly shifted the equity needle in decades of efforts (George et al., 2019). STEM intervention efforts have taken many forms but the focus has been on student support programs, often targeted toward a specific student population (Pearson

et al., 2022). While many of these programs have seen remarkable results for individual cohorts (Sto. Domingo et al., 2019), efforts to broaden the impact of these programs have been hamstrung by programmatic silos and shifting funding and participation structures (Rincon & George-Jackson, 2016). This data note describes the initial stages of a program designed to address these barriers by structuring a community of practice and institutionalizing equity pathways in a specific, critical area of postsecondary educational access: transfer processes from two-year to four-year institutions for low-income students in STEM fields. The STEM Transfer Partnership (STP) established by Community College Research Initiatives (CCRI) was designed to address the barriers that have limited the impact of STEM equity initiatives by building systems level change through a network of two- and four-year institutions connected and supported through an intervention strategy that balances structured guidance with participant leadership, allowing for organizational change that is both evidence-based and context-specific.

PROGRAM BACKGROUND AND DATA SOURCES

CCRI's STEM Transfer Partnership (STP) program is a 3-year, research-driven initiative designed to create sustainable STEM pathways for low-income students through a state-wide consortium of STEM transfer partnerships. Beginning in January 2022, the program includes 5 convenings as well as monthly coaching sessions through which two-year and four-year institutional pairs develop interventions to increase low-income student success in STEM transfer and baccalaureate completion. In this report, we examine initial stages in expanding equity in the transfer process through STP, focusing on the first six months of the program. The program goal is to establish networks of innovative STEM transfer practices that are both sustained and extendable to a variety of institutional contexts. In the work toward this goal, CCRI is guided by two primary strategies, rooted in both practitioner reports and the empirical literature on organizational change. First, the program centers the contextually-specific knowledge of institutional agents, engaging them as authors of the change process within their own institutions. At the same time, the program scales the projects for organizational change into concrete steps through a series of flexibly structured protocols that dismantle the task of broad-scale change into actionable, incremental steps.

In September 2021, CCRI invited applications from two-year and four-year institutional pairs, offering each pair $50,000 in funding to support their participation in the program and implementation of STEM transfer interventions. In total, 10 institutional pairs were accepted into the program, initiating their partnership through the application itself, which required collaborative reflection on existing transfer structures and data sharing. After acceptance into the program, participants completed an initial survey about current needs and future goals, participated in an intensive full day convening, analyzed their current and future partnership level, drafted an action plan, and completed a post-convening survey. The data presented here were collected over a six month period encompassing the application through the first convening and includes data from program applications, two surveys, participant responses to three different STP partnership development protocols, the convening transcript and researcher observations of team breakout groups. Partnership teams will continue to participate in the program through the implementation, evaluation, and dissemination stages of their STEM transfer interventions. This data note is specifically focused on the initial stages of partnership development in order to highlight the key challenges and supporting strategies essential to establishing a community of practice around STEM transfer partnership, acknowledging obstacles, and structuring concrete, actionable steps to overcome barriers to equity for low-income transfer students in STEM fields.

ENGAGING PARTICIPANTS AS LEADERS

The process of engaging institutions as leaders and creative problem solvers in their own transfer partnerships began before the partnership teams

were officially accepted into the program, through the program application. The application included standard questions about student population and institutional characteristics but also structured an initial self-assessment of what each institutional member knew about the other. For example, one question asked if the two institutions had previously shared data and followed up, "What types of data have you shared?" Most institutional pairs (6/10) had never shared data before beginning the application process. Data sharing arrangements among the four institutional pairs that reported previous exchange of information were characterized as limited, informal, and short term, often linked temporarily to a grant funded program or focused exclusively on a specific academic discipline or degree program. One typical response summed up their previous data sharing, "The sharing of data has been limited to a handful of programs with some success." Consistent with previous research on STEM intervention programs, participants described pockets of connection and temporary programs that sometimes generated positive outcomes for transfer students but without sustained and comprehensive impact.

In order to overcome these barriers, the program emphasizes community and connection through a two-pronged approach: building sustained partner relationships and extending that connection through a broader community of practice, inclusive of all 17 postsecondary institutions[1], encompassing 85 team members including faculty, staff, and administrative leaders. Previous connections between partner institutions had been informal, sporadic, based on ad hoc connections. Before coming together for the first program convening, participants filled out a pre-convening survey which served to direct the content of the sessions as well as structure reflection and assessment from program participants. One prompt asked participants to describe the transfer partnership work that their institutions had done before. Answers often referenced isolated successes in temporary programs or connections through individuals, as with advisors or faculty who had worked at both institutions and had knowledge of curriculum and degree requirements at both ends of the transfer process. Connections were time-limited and narrowly defined, often events, presentations, individual courses, or programs dedicated to broader student populations that generated temporary connections. Despite the challenges to continuity in previous relationships, participants were excited at the prospect of developing their partnership, centering student success and equity as their motivation. One typical response explained, "We are building on some past superficial relationships, I think we're all excited to build a stronger partnership for our students." After describing a series of loose interactions between the two institutions, one response expressed a shared investment in more structured, enduring connections: "I think everyone is interested in tightening our connections to help support transfer student success." Even for institutions that had no previous partnership, there was a sense of hopefulness in their shared motivations. "There has been no specific collaboration between our programs around transfer success as of yet and we are excited to further strengthen our partnership in this new direction." Across the gamut of divergent systems and program pathways among the two-year and four-year institutions, participants embraced the idea of taking concrete steps to solidify historically loose connections and build durable transfer pathways.

STRUCTURING PARTNERSHIPS

The STP approach to supporting the construction of durable STEM transfer pathways focuses on striking a balance between shared structure and flexible, contextually specific participant direction. To this end, at the first convening, participants completed a series of self-assessments, beginning with less structured, brainstorming platforms ("jamboards") and moving into more specific reflection and planning. Working together within teams and sharing out their progress with the larger group, they engaged in reflection and self-assessment using a partnership assessment tool where they defined their partnership levels in five inter-institutional practices areas including advising, recruitment and enrollment, financial aid, faculty

[1] Among the 10 partnership teams, three of the institutions have two teams resulting in 17 distinct institutions.

and curriculum, and data sharing. Drawing upon previous research on effective transfer partnerships, the assessment tool provided terms to place their partnership along a continuum, from cooperation to alliance, where cooperation involves minimal, passive effort to facilitate transfer and alliance involves long-term and strategic planning, focused on the integration of systems to create structures that improve the transfer process (Yeh & Wetzstein, 2020). In this self-guided assessment, most partnerships reported a cooperation level, in most if not all functional areas. By structuring this assessment in pre-defined terms, the program united participants with a shared vocabulary and solidified goals, moving from broad definitions to specific action steps, centering team members as full participants in building the partnership structure.

Despite past and current challenges, loose connections, and bureaucratic hurdles, many participants expressed optimism about the possibility of significantly changing their transfer pathways through the program, setting partnership goals at more invested levels in multiple functional areas. After the convening, this optimism was more distinct. In a post-convening survey item that asked, "How confident are you that your STEM transfer partnership will continue to develop?" 20 of 34 respondents rated their confidence at 5 on a scale of 1 to 5 ("Very confident"), with 11 respondents expressing a confidence level of 4 out of 5. The team members in this program were highly motivated, ready to set aside old organizational processes that no longer served students. Overwhelmingly, participants were united in a commitment to an innovative partnership, one that carved new pathways to institutional and student success.

The partnership planning tools and protocols that structured the first partnership program convening were key to participants' growing optimism. These tools gave concrete form to goals, barriers, and partnership needs. While providing a shared structure and vocabulary, they also cultivated participants as leaders in their own partnership development. In the post-convening survey, when asked the question "How useful was the information and activities provided during this convening?" 19/34 rated it 5 on 1-5 Likert scale, ("Extremely useful,") with 11 answering with a rating of 4. All 34 individual responses to the post-convening survey pointed out the usefulness of the action plan, team time (which was centered on the partnership planning tools), and other STP protocols. By engaging in concrete tools, transfer teams were able to tackle the barriers to change typical of large, complex organizations through a shared vocabulary, research-informed change strategies, and self-authored action plan.

OVERCOMING SILOS THROUGH COMMUNITY

In addition to putting specifics to broad, far reaching problems, the STP program structure sought to dismantle disciplinary and institutional silos by building a community of over 85 postsecondary faculty and practitioners who shared an investment in student success in STEM transfer processes. Previous connections have been made at the individual level, informally, sometimes through projects of limited duration and breadth. For the transfer partnership participants, the key benefit of the convening was connections between institutional partners and learning from the wider community of practice. In the post-convening survey, participant responses demonstrated themes of communication and connection, framing these ideas as key to efforts to increase equity and access in STEM education. In an open response section of the survey when participants were asked to describe what they learned through the program, they often described the perspective shift they experienced as a result of building and learning from the STP community. One respondent named a unity of purpose as a key lesson of the convening: "We are all working towards the same goal." Coming from the relative isolation of their colleges and programs, participants felt encouraged to learn that others had the same challenges and drive to create change. "It's comforting to know schools from all over the state share similar concerns. We're not in this alone." The

responses also demonstrated that the program had helped reframe barriers as systemic rather than individual. One response reported they learned "SOOO much! I don't think I could summarize it here - communication with others, discovering this is not an 'us' problem but a 'system' problem and we all need to be doing more." For these participants in the early stages of building an innovative and sustainable transfer partnership, the initial steps to building effective pathways included seeing the broader landscape, establishing cross-institutional community, and reframing their own experiences in conversation with others that shared their commitment to equity in STEM pathways.

CONCLUSION

The data from this initial stage of a STEM transfer intervention program confirms what research would suggest: creating more equitable pathways for STEM degree attainment within and between postsecondary institutions is a formidable task. Postsecondary faculty, staff, and administrators, though passionately committed to expanding access to STEM education and supporting student success, encounter deeply entrenched organizational processes that make improvement in the transfer process difficult to achieve. To be successful, interventions such as STP must address the fault lines of past interventions, addressing the informal and temporary nature of past solutions with structure and community.

Working in a community of practice expedites solutions, as multiple groups focus on removing shared barriers. It also supports a student-centered culture, where working together on transfer student outcomes is acknowledged as a valuable endeavor. The creation of sustainable partnerships requires pushing against established norms which are solely focused on individual institutional goals. Our research has shown that the forces working against transfer partnerships often sit at the intersection of institutional culture, policy, and practices (Yeh & Wetzstein, 2022). The goal of the STP project is to help partnership teams recognize their barriers and work to dismantle them to create sustainable structures to positively impact low-income STEM transfer student outcomes. A second goal is to find and leverage the catalysts for inter-institutional collaborations focused on enhancing their shared students' outcomes. Leveraging the transfer partnership catalysts will involve practice and sometimes policy modifications and ultimately a cultural shift toward working in partnership for transfer solutions.

Together, CCRI and the STEM transfer partnership institutions are moving forward in this work with excitement, determination, and commitment to crafting sustainable solutions to persistent problems. Changing deeply entrenched organizational norms and processes is difficult, but not impossible with a committed community of practice and effective strategies for change. The colleges and universities engaged in the STP program are not only improving transfer students' outcomes, but also serving as role models for other institutions in the state and beyond. We look forward to sharing our collaborative work and further progress in future data notes.

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Acknowledgments: *The authors would like to thank Ascendium for the generous support of the STEM Transfer Partnership project and the partners from the seventeen Washington State colleges and universities participating in this important work.*

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About the University of Washington's Community College Research Initiatives
The CCRI team conducts research and development to generate actionable knowledge to advance equity in the field of higher education. CCRI — a program of Undergraduate Academic Affairs — focuses on studying the experiences of underserved student groups that use community colleges as their entry point to higher education and the role that institutions play in equitable student educational and employment outcomes. Their goal is to leverage this research to effect change in postsecondary education at all levels. To learn more about CCRI, visit https://www.washington.edu/ccri/, follow on Twitter @CCRI_UW and LinkedIn, https://www.linkedin.com/company/ccri-uw/.

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Suggested citation: Cate, L., Wetzstein, L., & Kovacich, K. (2022, August). *Structuring STEM Transfer Partnership Success* (STEM Transfer Partnership Series, Data Note 1). Seattle, WA: Community College Research Initiatives, University of Washington. Retrieved from https://www.uw.edu/ccri/stpdatanote1.